



Instruction booklet and **IE**
warning

Installer
User
Maintenance Technician

AVIO 24 2 ERP

Wall-hung boiler with storage tank, open chamber (type B) and natural draught

The European regulation 813/2013 provides that this boiler can be installed only to replace similar equipment connected to existing branched multiple flues.

1.038455ENG



Dear Customer,

Our compliments for having chosen a top-quality Immergas product, able to assure well-being and safety for a long period of time. As an Immergas customer you can also count on a qualified after-sales service, prepared and updated to guarantee constant efficiency of your boiler. Read the following pages carefully: you will be able to draw useful suggestions regarding the correct use of the appliance, the respect of which, will confirm your satisfaction for the Immergas product.

For any interventions or routine maintenance contact Authorised Centres: these have original spare parts and boast of specific preparation directly from the manufacturer.

General recommendations

All Immergas products are protected with suitable transport packaging.

The material must be stored in dry premises and protected against weathering.

The instruction book is an integral and important part of the product and must be consigned to the user also in the case of transfer of ownership.

It must be kept well and consulted carefully, as all of the warnings supply important indications for safety in the installation, use and maintenance stages.

This instructions manual provides technical information for installing Immergas boilers. As for the other issues related to boiler installation (e.g. safety in the work site, environment protection, injury prevention), it is necessary to comply with the provisions specified in the regulations in force and principles of good practice.

In compliance with legislation in force, the systems must be designed by qualified professionals, within the dimensional limits established by the Law. Installation and maintenance must be performed in compliance with the regulations in force, according to the manufacturer's instructions and by an authorised company, which has specific technical expertise in the system sector, as required by Law.

Improper installation or assembly of Immergas appliance and/or components, accessories, kit and devices can cause unexpected problems to persons, animals and objects. Read the provided product instructions carefully in order to install the product correctly

Maintenance must be carried out by skilled technical staff. The Authorised After-sales Service represents a guarantee of qualifications and professionalism.

The appliance must only be destined for the use for which it has been expressly declared. Any other use must be considered improper and therefore dangerous. In the case of errors during installation, running and maintenance due to the failure to comply with the technical laws in force, standards or the instructions contained in this book (or however supplied by the manufacturer), the manufacturer is excluded from any contractual and extra-contractual liability for any damages and the appliance warranty is invalidated.

The company **IMMERGAS S.p.A.**, with registered office in via Cisa Ligure 95 42041 Brescello (RE), declares that the design, manufacturing and after-sales assistance processes comply with the requirements of standard **UNI EN ISO 9001:2008**.

For further details on the product CE marking, request a copy of the Declaration of Conformity from the manufacturer, specifying the appliance model and the language of the country.

Immergas S.p.A. declines all liability due to printing or transcription errors, reserving the right to make any modifications to its technical and commercial documents without forewarning.

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1 INSTALLATION OF THE BOILER

1.1 INSTALLATION RECOMMENDATIONS.

The Avio 24 2 ErP boiler has been designed for wall mounted installation only, for heating and production of domestic hot water for domestic use and similar purposes.

The place of installation of the appliance and relative Immergas accessories must have suitable features (technical and structural) such to allow (always in safety, efficiency and comfortable conditions):

- installation (according to the provisions of the technical legislation and technical regulations);
- maintenance operations (including scheduled, periodic, routine and special maintenance);
- removal (to outdoors in the place for loading and transporting the appliances and components) as well as their possible replacement with equivalent appliances and/or components.

The wall surface must be smooth, without any protrusions or recesses enabling access to the rear part. They are NOT designed to be installed on plinths or floors (Fig. 1-1).

Only professionally enabled companies are authorised to install Immergas gas appliances. Installation must be carried out according to regulation standards, current legislation and in compliance with local technical regulations and the required technical procedures.

Attention: Immergas declines all liability for damages caused by boilers removed from other systems or for any non-conformities of such equipment.

Before installing the appliance, ensure that it is delivered in perfect condition; if in doubt, contact the supplier immediately.

Packing materials (staples, nails, plastic bags, polystyrene foam, etc.) constitute a hazard and must be kept out of the reach of children. If the appliance is installed inside or between cabinets, ensure sufficient space for normal servicing; therefore it is advisable to leave a clearance of at least 3 cm between the boiler casing and the vertical sides of the cabinet.

Leave adequate space above the boiler for possible water and fume removal connections.

At least 60 cm must be left below the boiler in order to guarantee replacement of the magnesium anode.

It is just as important that the intake grids are not obstructed.

Keep all flammable objects away from the appliance (paper, rags, plastic, polystyrene, etc.). Do not place household appliances underneath the boiler as they could be damaged if the safety valve intervenes (if not conveyed away by a draining funnel), or if there are leaks from the hydraulic connections; on the contrary, the manufacturer cannot be held responsible for any damage caused to the household appliances. For the aforementioned reasons, we recommend not placing furnishings, furniture, etc. under the boiler.

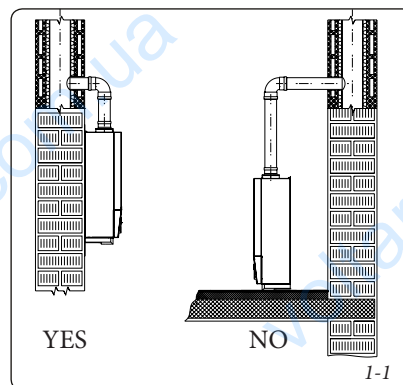
In the event of a malfunction, fault or incorrect operation, turn the appliance off and contact an authorised company (e.g. the Authorised Technical Assistance centre, which has specifically trained staff and original spare parts).

Do not attempt to modify or repair the appliance alone. Failure to comply with the above implies personal responsibility and invalidates

the warranty.

• Installation regulations:

- installation of these boilers in bedrooms, studio flats and bathrooms, or in premises where there are wood fired heaters (or by solid fuels in general) and in premises next to or connected to them, is subject to the regulatory/legislative provisions in force in the country.
- installation in places with a fire risk is prohibited (for example: underground car parks, garages), potentially dangerous places, gas appliances and relative flue ducts.
- installation is prohibited on the vertical projection of cooking hobs;
- installation is forbidden in places/rooms that constitute public areas of apartment buildings, internal stairways or other escape routes (e.g. landings, entrance halls, etc.) unless otherwise provided by local regulations;
- installation is also forbidden in places/rooms that constitute public areas of apartment buildings such as cellars, entrance halls, attics, lofts, etc., unless otherwise provided for by local regulations in force;
- Type B open chamber boilers must not be installed in places where commercial, artisan or industrial activities take place, which use products that may develop volatile vapours or substances (e.g. acid vapours, glues, paints, solvents, combustibles, etc.), as well as dusts (e.g. dust deriving from the working of wood, coal fines, cement, etc.), which may be damaging for the components of the appliance and jeopardise functioning.



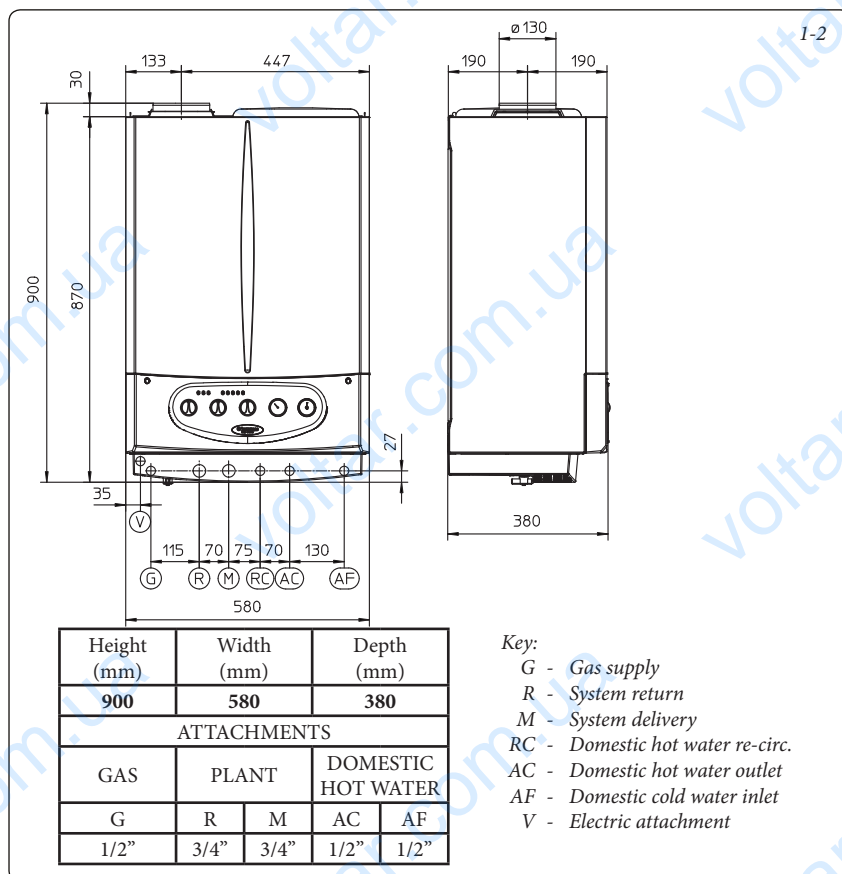
- They must also be installed in an environment in which the temperature cannot fall below 0°C. They must not be exposed to atmospheric agents.

- This natural draught boiler can be connected only to a multiple branched flue served by a variety of users in existing buildings. The boiler takes the combustion air directly from the installation room and is equipped with draught-breaker/anti-wind device. Due to lower efficiency, any other use of this boiler must be avoided as it would lead to greater consumption and higher operating costs.

Important: wall mounting of the boiler must guarantee stable and efficient support for the generator.

The plugs (standard supply) are to be used only in conjunction with the mounting brackets or fixing template to fix the appliance to the wall; they only ensure adequate support if inserted correctly (according to technical standards) in walls made of solid or semi-hollow brick or block. In the

1.2 MAIN DIMENSIONS.



case of walls made from hollow brick or block, partitions with limited static properties, or in any case walls other than those indicated, a static test must be carried out to ensure adequate support.

N.B.: the hex head screws supplied in the blister pack are to be used exclusively to fix the relative mounting bracket to the wall.

These boilers are used to heat water to below boiling temperature in atmospheric pressure. They must be connected to a heating system and hot water circuit suited to their performance and capacity.

Anti-Legionella thermal treatment of the Immergas storage tank (which can be activated through the specific function present on the set thermoregulation systems): during this phase, the water temperature inside the storage tank exceeds 60 °C resulting in burns hazards. Keep this DHW treatment under control (and inform the users), to prevent unexpected damage to persons, animals and objects. If required, a thermostatic valve must be installed at the DHW outlet to prevent burns.

1.3 ANTIFREEZE PROTECTION.

Minimum temperature -5°C. The boiler comes standard with an anti-freeze function that activates the pump and burner when the system water temperature in the boiler falls below 4°C. The antifreeze function is only guaranteed if:

- the boiler is correctly connected to gas and electricity power supply circuits;
- the boiler is powered constantly;
- the boiler is on and not in Stand-by;
- the boiler is not in ignition failure block (Par. 2.7);
- the boiler essential components are not faulty.

In these conditions the boiler is protected against freezing to an ambient temperature of -5°C.

N.B.: if the boiler is installed in places where the temperature falls below 0°C the domestic hot water and central heating attachment pipes must be insulated.

The water in the storage tank unit is not protected against freezing when the boiler is switched off.

1.4 BOILER CONNECTION UNIT.

The connection unit consisting of all the necessary parts to perform the hydraulic and gas system connections of the appliance comes as standard with the boiler.

1.5 GAS ATTACHMENT.

Our boilers are designed to operate with methane gas (G20) and LPG. Supply pipes must be the same as or larger than the 1/2" G boiler fitting. Before connecting the gas line, carefully clean inside all the fuel feed system pipes to remove any residue that could impair boiler efficiency. Also make sure the gas corresponds to that for which the boiler is prepared (see boiler data-plate). If different, the appliance must be converted for operation with the other type of gas (see converting appliance for other gas types). It is also important to check the dynamic pressure of the mains (methane or LPG) used to supply the boiler, which must comply with the technical standards in force, as insufficient levels may reduce generator output and cause discomfort to the user. Ensure correct gas cock connection. The gas supply pipe must be suitably dimensioned according to current regulations in order to guarantee correct gas flow to the boiler even in conditions of max. generator output and to guarantee appliance efficiency (technical specifications). The coupling system must conform to technical standards in force..

Combustible gas quality. The appliance has been designed to operate with gas free of impurities; otherwise it is advisable to fit special filters upstream from the appliance to restore the purity of the gas.

Storage tanks (in case of supply from LPG depot).

- New LPG storage tanks may contain residual inert gases (nitrogen) that degrade the mixture delivered to the appliance causing functioning anomalies.
- Due to the composition of the LPG mixture, layering of the mixture components may occur during the period of storage in the tanks. This can cause a variation in the heating power of the mixture delivered to the appliance, with subsequent change in its performance.

1.6 HYDRAULIC ATTACHMENT.

Important: In order not to void the warranty before making the boiler connections, carefully clean the heating system (pipes, radiators, etc.) with special pickling or de-scaling products to remove any deposits that could compromise correct boiler operation.

A treatment of the water of the heating and water system is required, in compliance with the technical standards in force, in order to protect the system and the appliance from deposits (e.g. limescale), slurry or other hazardous deposits.

Water connections must be made in a rational way. The boiler safety valve outlet must be connected to a discharge funnel. Otherwise, the manufacturer declines any responsibility in case of flooding if the drain valve cuts in.

Attention: Immergas declines all liability in the event of damage caused by the inclusion of automatic filling that is not of its own brand.

In order to meet the system requirements established by the technical regulation in force in relation to the pollution of drinking water, we recommend installing the IMMERGAS anti-backflow kit to be used upstream of the cold water inlet connection of the boiler. It is also recommended that the heat transfer fluid (e.g. water + glycol) entered in the primary circuit of the boiler (heating circuit), complies with the local regulations in force.

Important: to preserve the life and efficiency of the domestic hot water exchanger it is recommended to install the "polyphosphate proportioner" kit in the presence of water whose characteristics can give rise to scale deposits.


1.7 ELECTRICAL CONNECTION.

The "Avio 24 2 ErP" boiler has an IPX4D protection rating for the entire appliance. Electrical safety of the unit is reached when it is correctly connected to an efficient earthing system as specified by current safety standards.

Important: Immergas S.p.A. declines any responsibility for damage or physical injury caused by failure to connect the boiler to an efficient earthing system or failure to comply with the reference standards.

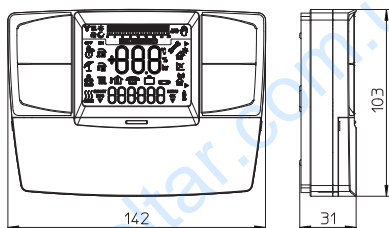
Also ensure that the electrical installation corresponds to maximum absorbed power specifications as shown on the boiler data-plate leads.

Boilers are supplied complete with an "X" type power cable without plug.

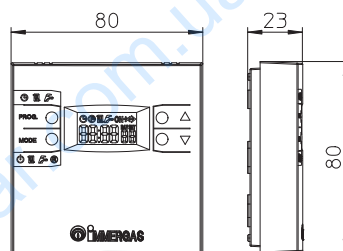
The power supply cable must be connected to a 230V ±10% / 50Hz mains supply respecting L-N polarity and earth connection:  this network must also have a multi-pole circuit breaker with class III over-voltage category. When replacing the power supply cable, contact a qualified firm (e.g. the Authorised After-Sales Technical Assistance Service).

The power cable must be laid as shown.

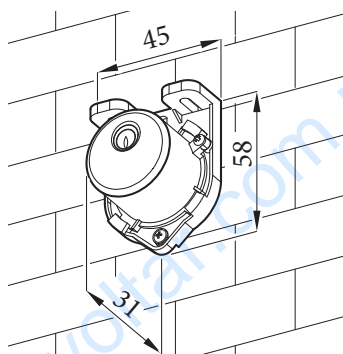
In the event of mains fuse replacement on the control card, use a 3.15A quick-blow fuse. For the main power supply to the appliance, never use adapters, multiple sockets or extension leads.



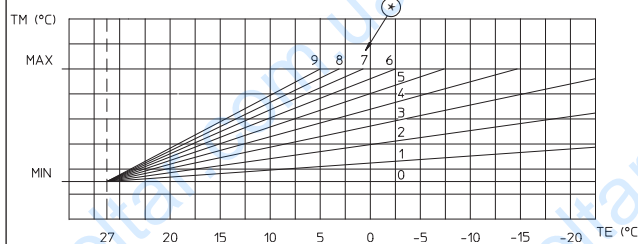
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1.8 REMOTE CONTROLS AND ROOM CHRONOTHERMOSTATS (OPTIONAL).

The boiler is prepared for application of room chronothermostats and external probe. These Immergas components are available as separate kits to the boiler and are supplied on request.

All Immergas chronothermostats are connected with 2 wires only. Carefully read the user and assembly instructions contained in the accessory kit.

- On/Off digital chrono-thermostat (Fig. 1-3). The chrono-thermostat allows:
 - set two room temperature value: one for daytime (comfort temperature) and one for night-time (reduced temperature);
 - set a weekly program with four daily switch on and switch off times;
 - select the required operating mode from the various possible alternatives:
 - manual operation (with adjustable temperature).
 - automatic operation (with set programme).
 - forced automatic operation (momentarily changing the temperature of the automatic programme).

The chronothermostat is powered by two 1.5V LR 6 type alkaline batteries.

- There are two types of Remote Friend ControlV2 (CARV2) (Fig. 1-3) and Mini Digital Remote Control (Mini CRD) (Fig. 1-4) both with room chronothermostat functioning. In addition to the functions described in the previous point, the control panel enables the user to keep under control and within reach all the important information regarding operation of the appliance and the heating system with the ability to easily act on previously set parameters, with no need to go to where the appliance is installed. The panel is provided with self-diagnosis to display any boiler functioning anomalies. The climate chrono-thermostat incorporated into the remote panel enables the system flow temperature to be adjusted to the

actual needs of the room being heated, in order to obtain the desired room temperature with extreme precision and therefore with evident saving in running costs. The remote control is fed directly by the boiler by means of the same 2 wires used for the transmission of data between boiler and device.

Important: If the system is subdivided into zones using the relevant kit, the CARV2 must be used with its climate thermostat function disabled, i.e. it must be set to On/Off mode. The Mini CRD cannot be used for plants divided into zones.

Electrical connection of the Remote Friend ControlV2, chronothermostat On/Off (Optional) or Mini. *The operations described below must be performed after having removed the voltage from the appliance.* The eventual thermostat or On/Off room chronothermostat must be connected to terminals 40 and 41 eliminating jumper X40 (Fig. 3-2). Make sure that the On/Off thermostat contact is of the "clean" type, i.e. independent of the mains supply; otherwise the electronic adjustment card would be damaged. The eventual Remote Friend ControlV2 must be connected by means of terminals IN+ and IN- to terminals 42 and 43, eliminating jumper X40 on the terminal board (in the boiler) respecting polarity (Fig. 3-2). Connection with the wrong polarity prevents functioning, but without damaging the Remote Friend ControlV2. Any Digital Remote Control must be connected to terminals 40 e 41 eliminating jumper X40 on the P.C.B. (in the boiler), (Fig. 3-2). The boiler works with the parameters set on the Remote Friend ControlV2 only if the boiler main selector is turned to Domestic/Remote Control (🏠🔌). The boiler can only be connected to one remote control.

Important: If the Remote Friend ControlV2, Mini Digital Remote Control or any other On/Off chronothermostat is used arrange two separate lines in compliance with current regulations regarding electrical systems. Boiler pipes must

never be used to earth the electric or telephone lines. Ensure elimination of this risk before making the boiler electrical connections.

1.9 EXTERNAL PROBE (OPTIONAL).

- External temperature probe (Fig. 1-5). Refer to the relevant instruction sheet for positioning the external probe.

This sensor can be connected directly to the boiler electrical system and allows the max. system delivery temperature to be automatically decreased when the outside temperature increases, in order to adjust the heat supplied to the system according to the change in external temperature. The external probe always operates when connected, regardless of the presence or type of room chronothermostat used. The correlation between system delivery temperature and outside temperature is determined by the position of the knob on the boiler control panel according to the curves shown in the diagram (Fig. 1-6). The external probe electrical connection must be made on clamps 38 and 39 on the boiler circuit board (Fig. 3-2).

* (Fig. 1-6) Position of the heating temperature user adjustment.

1.10 VENTILATION OF THE ROOMS.

In the room in which the boiler is installed it is necessary that at least as much air flows as that requested for by normal combustion of the gas and ventilation of the room. Natural air flow must take place directly through:

- permanent holes in the walls of the room to ventilate that go towards the outside;
- ventilation pipes, individual or branched type.

The air used for ventilation must be withdrawn directly from outside, in an area away from sources of pollution. Natural air flow is also allowed indirectly by air intake from adjoining rooms. For further information relative to ventilation of the rooms follow that envisioned in the regulation.

Evacuation of foul air. In the rooms where the gas appliances are installed it may also be necessary, as well as the intake of combustion agent air, to evacuate foul air, with consequent intake of a further equal amount of clean air. This must be realised respecting the provisions of the technical regulations in force.

1.11 EVACUATION OF COMBUSTION PRODUCTS: FLUE DUCT AND BRANCHED MULTIPLE FLUES

The European regulation 813/2013 provides that this boiler can be installed only to replace similar equipment connected to existing branched multiple flues.

Connection to branched multiple flues.

Fitting the appliances to a branched multiple flues takes place by means of flue ducts.

In the event of fittings with pre-existing flues, these must be in safe and efficient status and perfectly clean because the detachment of any waste from the walls during functioning, could block the passage of flue gases, thus causing extremely dangerous situations for the user.

The flue ducts must be connected to the chimney or flue in the same room in which the appliance is installed or, at most, in the adjoining room and must comply with the requirements indicated by the current technical regulations.

1.12 FLUE EXHAUST CONTROL DEVICE.

Important: it is prohibited to put the fumes exhaust control device out of order voluntarily. Every piece of this device must be replaced using original spare parts if they have deteriorated. In the case of repeated interventions of the fumes exhaust control device, check the fumes exhaust flue and the ventilation of the room in which the boiler is located.

1.13 SYSTEM FILLING.

Once the boiler is connected, proceed with system filling via the filling valve (Fig. 2-2).

Filling is performed at low speed to ensure release of air bubbles in the water via the boiler and heating system vents.

The boiler has a built-in automatic venting valve on the circulator. *Check if the cap is loose.* Open the radiator air vent valves.

Close vent valves only when water is delivered.

Close the filling valve when the boiler pressure gauge indicates approx. 1.2 bar.

N.B.: During these operations, turn on the circulating pump at intervals by means of the main selector switch on the control panel.

1.14 GAS SYSTEM START-UP.

To start up the system, make reference to the Standard.

In particular, for new gas systems:

- open windows and doors;
- avoid presence of sparks or naked flames;
- bleed all air from pipelines;
- check that the internal system is properly sealed according to specifications.

1.15 START-UP OF THE BOILER (IGNITION).

To commission the boiler (the operations listed below must only be performed by a qualified firm and without any unauthorised persons):

- check that the internal system is properly sealed according to the specifications set forth by technical regulations in force;
- ensure that the type of gas used corresponds to boiler settings;
- check that there are external factors that may cause the formation of fuel pockets;
- switch on the boiler and ensure correct ignition;
- make sure that the gas flow rate and relevant pressure values comply with those given in the manual (Par. 3-16);
- check the correct ventilation of the rooms;
- check the existing draught during normal functioning of the appliance, e.g. a draught gauge positioned at the exit of the appliance combustion products;
- check that there is no backflow of combustion products into the room, even during functioning of fans;

- ensure that the safety device is engaged in the event of gas supply failure and check activation time;
- check activation of the main circuit-breaker selector upstream from the boiler and on the unit.

The boiler must not be started up in the event of failure to comply with any of the above.

1.16 DOMESTIC HOT WATER BOILER DEVICE.

The Avio 24 2 ERP boiler is the accumulation type with a capacity of 45 litres. It contains a large coiled stainless steel heat exchanger pipe, which allows to notably reduce hot water production times. These boilers built with stainless steel casing and bottoms, guarantee long duration.

The assembly concepts and welding (T.I.G.) are implemented to the minimum detail to ensure maximum reliability.

The lower inspection flange ensures practical control of the boiler and the coiled heat exchanger and easy internal cleaning.

The domestic water attachments are found on the flange cover (cold inlet and hot outlet) and also the magnesium anode holder cap, including the latter, supplied as standard for internal protection of the boiler from possible corrosion.

N.B.: every year a skilled technician (e.g. Authorised After-sales Service), must check the efficiency of the boiler's Magnesium Anode. The boiler is prepared for introduction of the domestic water re-circulation connection.

1.17 CIRCULATION PUMP.

The boiler is supplied with circulator fitted with speed regulator.

These settings are suitable for most systems.

In fact, the pump is equipped with electronic control to set advanced functions. For proper operation one must select the most suitable type of operation for the system and select a speed in the available range, with a focus on energy savings.

By-pass Regulation (part. 21 Fig. 1-10). The boiler is supplied with by-pass closed by 1.5 turns with respect to all open.

If necessary, the by-pass can be regulated to system requirements from minimum (by-pass closed) to maximum (by-pass open). Adjust using a flat head screwdriver, turn clockwise to open the by-pass; turn anti-clockwise to close it.

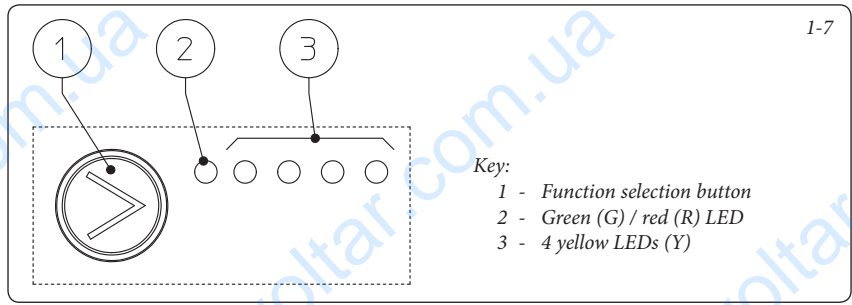
Display of operation status. During normal operation the status LED (2) is on green, the four yellow LEDs (3) indicate circulator absorption according to the following table:

Circulating pump LED	Absorption															
<table style="border: none;"> <tr> <td>G</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>●</td><td>○</td><td>○</td><td>○</td> </tr> <tr> <td>On</td><td>On</td><td>Off</td><td>Off</td><td>Off</td> </tr> </table>	G	Y	Y	Y	Y	●	●	○	○	○	On	On	Off	Off	Off	0 ÷ 25 %
G	Y	Y	Y	Y												
●	●	○	○	○												
On	On	Off	Off	Off												
<table style="border: none;"> <tr> <td>G</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>●</td><td>●</td><td>○</td><td>○</td> </tr> <tr> <td>On</td><td>On</td><td>On</td><td>Off</td><td>Off</td> </tr> </table>	G	Y	Y	Y	Y	●	●	●	○	○	On	On	On	Off	Off	25 ÷ 50 %
G	Y	Y	Y	Y												
●	●	●	○	○												
On	On	On	Off	Off												
<table style="border: none;"> <tr> <td>G</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>●</td><td>●</td><td>●</td><td>○</td> </tr> <tr> <td>On</td><td>On</td><td>On</td><td>On</td><td>Off</td> </tr> </table>	G	Y	Y	Y	Y	●	●	●	●	○	On	On	On	On	Off	50 ÷ 75 %
G	Y	Y	Y	Y												
●	●	●	●	○												
On	On	On	On	Off												
<table style="border: none;"> <tr> <td>G</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>●</td><td>●</td><td>●</td><td>●</td> </tr> <tr> <td>On</td><td>On</td><td>On</td><td>On</td><td>On</td> </tr> </table>	G	Y	Y	Y	Y	●	●	●	●	●	On	On	On	On	On	75 ÷ 100 %
G	Y	Y	Y	Y												
●	●	●	●	●												
On	On	On	On	On												

Selection of operating mode. To see the current operation mode it is sufficient to press button (1) once.

To change operation mode press the button for between 2 to 10 seconds until the current configuration flashing, each time the button is pressed all possible functions are scrolled cyclically. After a few seconds without doing any operation the circulator memorises the selected mode and goes back to operation display.

Attention: The circulator has various built-in operation modes, however the constant curve operation mode must be selected according to the following table.



Circulating pump LED	Description															
<table style="border: none;"> <tr> <td>G</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>●</td><td>●</td><td>○</td><td>○</td> </tr> <tr> <td>On</td><td>On</td><td>On</td><td>Off</td><td>Off</td> </tr> </table>	G	Y	Y	Y	Y	●	●	●	○	○	On	On	On	Off	Off	Do not use
G	Y	Y	Y	Y												
●	●	●	○	○												
On	On	On	Off	Off												
<table style="border: none;"> <tr> <td>G</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>●</td><td>●</td><td>●</td><td>○</td> </tr> <tr> <td>On</td><td>On</td><td>On</td><td>On</td><td>Off</td> </tr> </table>	G	Y	Y	Y	Y	●	●	●	●	○	On	On	On	On	Off	Constant curve speed 2
G	Y	Y	Y	Y												
●	●	●	●	○												
On	On	On	On	Off												
<table style="border: none;"> <tr> <td>G</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>●</td><td>●</td><td>●</td><td>●</td> </tr> <tr> <td>On</td><td>On</td><td>On</td><td>On</td><td>On</td> </tr> </table>	G	Y	Y	Y	Y	●	●	●	●	●	On	On	On	On	On	Constant curve speed 3 (default)
G	Y	Y	Y	Y												
●	●	●	●	●												
On	On	On	On	On												
<table style="border: none;"> <tr> <td>G</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>●</td><td>●</td><td>○</td><td>●</td> </tr> <tr> <td>On</td><td>On</td><td>On</td><td>Off</td><td>On</td> </tr> </table>	G	Y	Y	Y	Y	●	●	●	○	●	On	On	On	Off	On	Constant curve speed 4
G	Y	Y	Y	Y												
●	●	●	○	●												
On	On	On	Off	On												

Constant curve: the circulator operates maintaining constant speed.

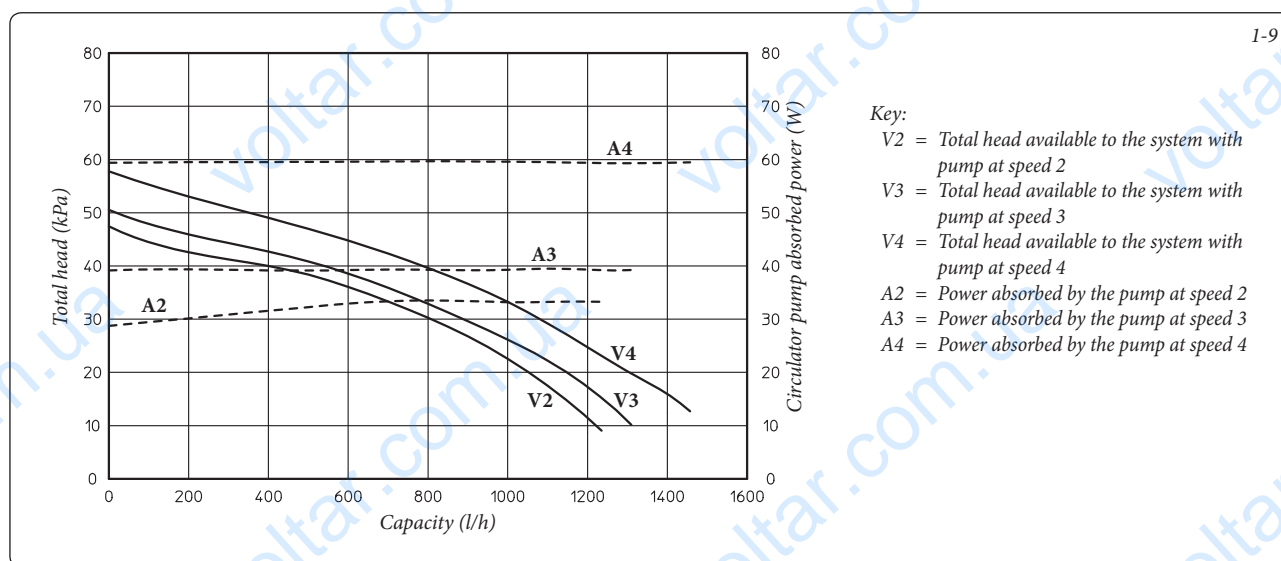
Selection button lock. The button has a feature that locks its operation to prevent accidental modifications, to lock the control panel it is necessary to press button (1) longer than 10 seconds (during which the current configuration flashes), the active lock is signalled by all LEDs of the control panel flashing. To unlock the button press again longer than 10 seconds.

Real time diagnostics: in the event of malfunction the LEDs provide information on the circulator operation status, see table (Fig. 1-8):

1-8

Circulating pump LED (first red LED)	Description	Diagnostics	Remedy															
<table border="0"> <tr> <td>R</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>○</td><td>○</td><td>○</td><td>●</td> </tr> <tr> <td>On</td><td>Off</td><td>Off</td><td>Off</td><td>On</td> </tr> </table>	R	Y	Y	Y	Y	●	○	○	○	●	On	Off	Off	Off	On	Circulator pump blocked	The circulator pump cannot restart automatically due to an anomaly	Wait for the circulator to make automatic release attempts or manually release the motor shaft acting on the screw in the centre of the head. If the anomaly persists replace the circulator.
R	Y	Y	Y	Y														
●	○	○	○	●														
On	Off	Off	Off	On														
<table border="0"> <tr> <td>R</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>○</td><td>○</td><td>●</td><td>○</td> </tr> <tr> <td>On</td><td>Off</td><td>Off</td><td>On</td><td>Off</td> </tr> </table>	R	Y	Y	Y	Y	●	○	○	●	○	On	Off	Off	On	Off	Abnormal situation (the circulator continues operating). low power supply voltage	Voltage off range	Check power supply
R	Y	Y	Y	Y														
●	○	○	●	○														
On	Off	Off	On	Off														
<table border="0"> <tr> <td>R</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td> </tr> <tr> <td>●</td><td>○</td><td>●</td><td>○</td><td>○</td> </tr> <tr> <td>On</td><td>Off</td><td>On</td><td>Off</td><td>Off</td> </tr> </table>	R	Y	Y	Y	Y	●	○	●	○	○	On	Off	On	Off	Off	Electrical fault (Circulator pump blocked)	The circulator is locked due to power supply too low or serious malfunction	Check the power supply, if the anomaly persists replace the circulator
R	Y	Y	Y	Y														
●	○	●	○	○														
On	Off	On	Off	Off														

Total head available to the plant.



1.18 KITS AVAILABLE ON REQUEST.

- Kit of system shutoff valves (on request). The boiler is designed for installation of system shutoff valves to be placed on delivery and return pipes of the connection assembly. This kit is particularly useful for maintenance as it allows the boiler to be drained separately without having to empty the entire system.
- System zone Kit (on request). If the heating system is to be divided into several zones (**max. three**), in order to interlock them with separate adjustments and to keep water flow rate high for each zone, Immergas supplies zone system kits by request.
- Polyphosphate batching kit (on request). The polyphosphate dispenser Reduces the formation of lime-scale and preserves the original heat exchange and domestic hot production water conditions. The boiler is prepared for application of the polyphosphate dispenser kit.

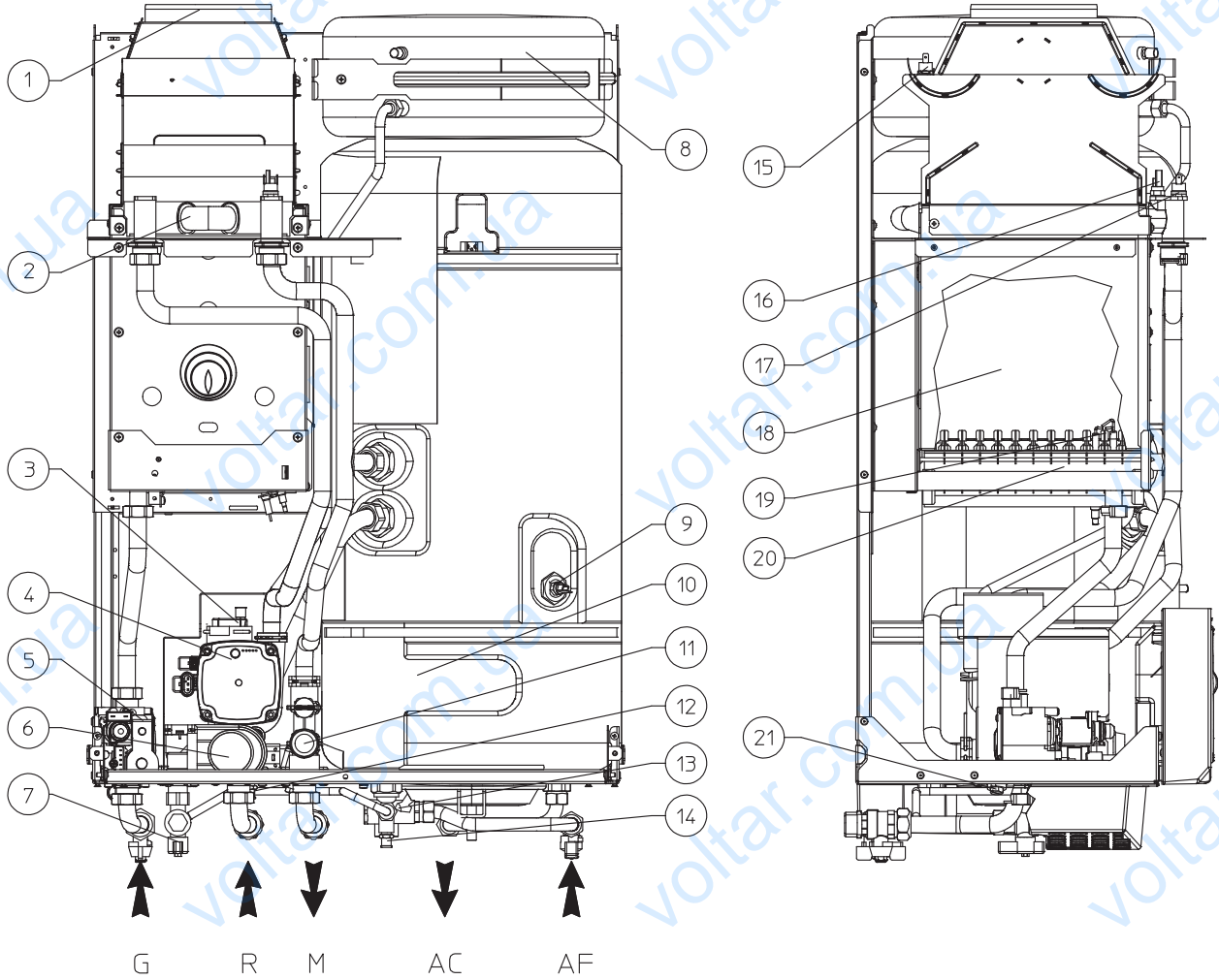
The above kits are supplied complete with instructions for assembly and use.

1.19 BOILER COMPONENTS.

INSTALLATOR

USER

MAINTENANCE TECHNICIAN



Key:

- | | |
|-----------------------------|-----------------------------------|
| 1 - Fumes hood | 12 - System emptying tap |
| 2 - primary heat exchanger | 13 - 8 bar safety valve |
| 3 - Air bleeding valve | 14 - Boiler emptying cock |
| 4 - Boiler circulation pump | 15 - Fumes thermostat |
| 5 - Gas valve | 16 - Delivery probe |
| 6 - 3-way valve (motorised) | 17 - Safety thermostat |
| 7 - System filler tap | 18 - Combustion chamber |
| 8 - System expansion tank | 19 - Ignition and detection plugs |
| 9 - Domestic water probe | 20 - Burner |
| 10 - Stainless steel boiler | 21 - Adjustable by-pass |
| 11 - 3 bar safety valve | |

2 INSTRUCTIONS FOR USE AND MAINTENANCE

2.1 CLEANING AND MAINTENANCE.

Attention: to preserve the boiler's integrity and keep the safety features, performance and reliability, which distinguish it, unchanged over time, you must at least execute maintenance operations on a yearly basis in compliance with what is stated in the relative point at "annual check and maintenance of the appliance", in compliance with national, regional, or local standards in force.

2.2 VENTILATION OF THE ROOMS.

In the room in which the boiler is installed it is necessary that at least as much air flows as that requested for by normal combustion of the gas and ventilation of the room. The provisions relative to ventilation, the flue ducts and multiple flues are stated in Par. 1.10 ÷ 1.12. If in doubt regarding correct ventilation, contact an authorised company.

2.3 GENERAL WARNINGS

Never expose the suspended boiler to direct vapours from a cooking surface.

Use of the boiler by unskilled persons or children is strictly prohibited.

If temporary shutdown of the boiler is required, proceed as follows:

- drain the heating system if anti-freeze is not used;
- shut-off all electrical, water and gas supplies.

In the case of work or maintenance to structures near ducting or devices for flue extraction and the relative accessories, switch off the appliance and on completion of the operations make sure that an authorised company verifies the efficiency of the ducting or the devices.

Never clean the appliance or connected parts with easily flammable substances.

Never leave containers or flammable substances in the same environment as the appliance.

It is prohibited and dangerous to obstruct the air intake, even partially, for the ventilation of the room in which the boiler is installed.

Due to the danger, operation is also prohibited in the same room as suction devices or the like, at the same time as the boiler unless there are additional openings dimensioned in a way to satisfy the additional requirement for air. For the dimensioning of these additional openings, refer to an authorised company.

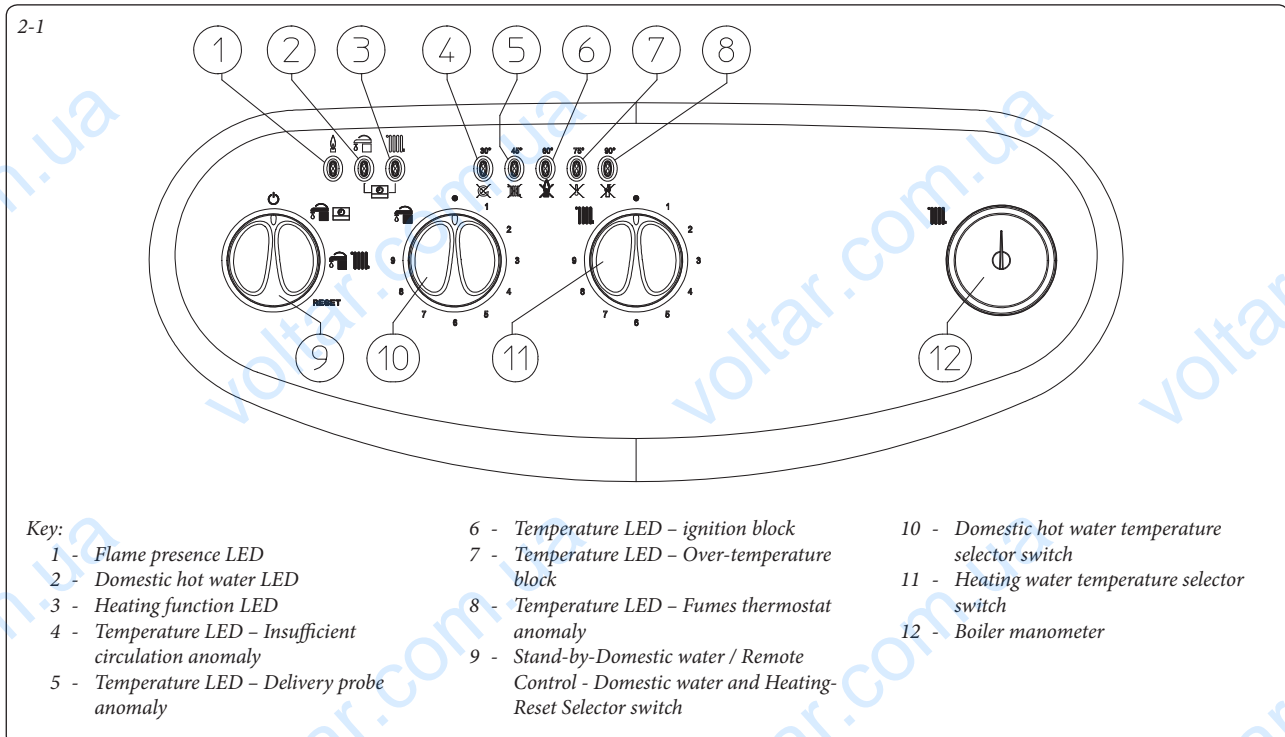
• **Important:** the use of components involving use of electrical power requires some fundamental rules to be observed such as:

- do not touch the appliance with wet or moist parts of the body; do not touch when barefoot;
- never pull electrical cables or leave the appliance exposed to atmospheric agents (rain, sunlight, etc.);
- the appliance power cable must not be replaced by the user;
- if the cable is damaged, switch off the appliance and solely contact an authorised company to replace it;
- if the appliance is not to be used for a certain period, disconnect the main power switch.

N.B.: the temperatures indicated by the display have a tolerance of +/- 3°C due to environmental conditions that cannot be blamed on the boiler.

At the end of its service life the appliance must not be disposed of like normal household waste nor discarded in the environment, but must be removed by an authorised company. Contact the manufacturer for disposal instructions.

2.4 CONTROL PANEL.



INSTALLATOR

USER

MAINTENANCE TECHNICIAN

2.5 IGNITION OF THE BOILER.

Before ignition make sure the heating system is filled with water and that the manometer (12) indicates a pressure of 1÷1,2 bar.

- Open the gas cock upstream from the boiler.
- Turn the master switch (9) taking it to the Domestic/Remote Friend Control^{V2} (CAR^{V2}) (☞) or Domestic Hot Water (☞) position.

N.B.: Once the main selector switch has been placed (9) on one of these positions, the presence of voltage is indicated by the switch-on with a fixed light of one of the LEDs from 4 to 8, which indicate the temperature of the output water from the main heat exchanger.

Important: flashing of one of the LEDs from 4 to 8 indicates that there is an anomaly present, refer to the successive paragraph.

Functioning of the boiler in domestic water mode and in heating mode is indicated respectively by the switch-on of LED 2 or LED 3 with a fixed light (in absence of remote controls).

- Operation with Remote Friend Control^{V2} (Optional). With selector switch (9) in position (☞) and Remote Control connected to the boiler selector switches (10) and (11) excluded. The boiler adjustment parameters are set from the control panel of the Remote

Friend Control^{V2}. Connection to the Remote Control is indicated by the contemporary fixed switch-on of LEDs 2 and 3 (☞). Also in the presence of Remote Control the indications of the temperature and any faults are maintained on the control panel.

- Operation without Remote Control. With the selector switch (9) in position (☞) the heating adjustment selector switch is cut out, the domestic hot water temperature is regulated by selector switch (10). With the selector switch in position (☞) the heating adjustment selector switch (11) is used to regulate the temperature of radiators, while selector (10) continues to be used for domestic hot water. Turn the selector switches in a clockwise direction to increase the temperature and in an anti-clockwise direction to decrease it.

From this moment the boiler functions automatically. With no demand for heat (heating or domestic hot water production) the boiler goes to “standby” function, equivalent to the boiler being powered without presence of flame (LED corresponding to the ignited boiler temperature). Each time the boiler lights up, the relative flame present symbol is displayed by the green LED 1 (☞).

N.B.: the boiler may start-up automatically if the anti-freeze function is activated.

2.6 FAULT AND ANOMALY SIGNALS.

The Avio 24 2 ERP boiler signals an anomaly by flashing of one of the LEDs from 4 to 8 or LEDs 1 and 2 coupled to LED 7. On any remote controls, the error code will be displayed using a numerical code preceded or followed by the letter E (e.g. CAR^{V2} = Exx, Mini CRD = xxE).

Flashing LED	Error Code	Anomaly signalled	Cause	Boiler status / Solution
Led 6 (☞)	01	No ignition block	In the event of request of room central heating or domestic hot water production, the boiler does not switch on within the preset time. If this does not occur within 10 seconds, the boiler remains in stand-by for 30 seconds, try again and if the second attempt fails it goes into “ignition block” (flashing LED 6).	To eliminate “no ignition block” the main switch (9) must be temporarily turned to the Reset position (1). Warning: the fault may be reset up to 5 times consecutively, after which the function is inhibited for at least one hour. One attempt is gained every hour for a maximum of 5 attempts. By switching the appliance on and off the 5 attempts are re-acquired. On commissioning or after extended inactivity it may be necessary to eliminate the “no ignition block”.
Led 7 (☞)	02	Safety thermostat block (over-temperature)	During operation, if a fault causes excessive overheating internally, in the exhaust, or an anomaly occurs in the flame control section, an overheating block is triggered in the boiler (LED 7 flashing).	To eliminate the “overheating block” the main switch (9) must be temporarily turned to the Reset position (1).
Led 8 (☞)	03	Flue safety thermostat block	The fume evacuation pipe does not function correctly (code 03).	The boiler goes into stand-by for 30 minutes, after which, if normal working conditions are restored, it re-starts without having to be reset. In the case of 3 consecutive blocks, the boiler itself blocks and it must be reset in order to re-start (1).
Led 2 (☞) and 7 (☞) blinking at the same time	04	Contacts resistance block	This occurs in the case of faults to the safety thermostat over-temperature).	The boiler does not start (1).
Led 5 (☞)	05	Flow probe anomaly	The board detects an anomaly on the flow probe.	The boiler does not start (1).
Led 2 (☞)	12	Storage tank probe anomaly	If the board detects a fault on the storage tank probe.	The boiler does not start in domestic hot water mode however, it remains in heating mode (1).
<p>(1) If the shutdown or fault persists, contact an authorised company (e.g. Authorised Technical After-Sales Service). (2) Error codes over 31 are not shown on the CAR^{V2} display.</p>				

Flashing LED	Error Code	Anomaly signalled	Cause	Boiler status / Solution
Led 1 () and 7 () blinking at the same time	20	Parasite flame block	This occurs in the event of a leak on the detection circuit or anomaly in the flame control unit.	Press the Reset button (1).
Led 4 ()	27	Insufficient circulation	This occurs if there is overheating in the boiler due to insufficient water circulating in the primary circuit; the causes can be: - low system circulation; check that no shut-off devices are closed on the heating circuit and that the system is free of air (deaired); - pump blocked; free the pump.	Press the Reset button (1).
Led 2 and 3 blinking at the same time ()	31	Loss of remote control communication	This occurs if an incompatible remote control is connected, or if communication between the boiler and the Remote Comando Amico ^{v2} (CAR ^{v2}) or digital remote control (Mini CRD) is lost.	Try the connection procedure again by turning the boiler off and turning the switch (9) to position (). If the CAR ^{v2} is still not detected on re-starting, the boiler will switch to local operating mode, i.e. using the controls on the boiler itself (1) (2).
<p>(1) If the shutdown or fault persists, contact an authorised company (e.g. Authorised Technical After-Sales Service). (2) Error codes over 31 are not shown on the CAR^{v2} display.</p>				

2.7 BOILER SHUTDOWN.

Disconnect the main selector switch (9) taking it to position “ ” (Leds from 1 to 8 off), disconnect the external omni-polar switch to the boiler and close the gas cock upstream from the appliance. Never leave the boiler switched on if left unused for prolonged periods.

2.8 RESTORING HEATING SYSTEM PRESSURE.

Periodically check the system water pressure. The boiler pressure gauge should read a pressure between 1 and 1.2 bar.

If the pressure falls below 1 bar (with the circuit cool) restore normal pressure via the valve located at the bottom of the boiler (Fig. 2-2).

N.B.: close the valve afterwards.

If pressure values reach around 3 bar the safety valve may be activated.

In this case, remove water from an air vent valve of a radiator until 1 bar is reached or ask for assistance from an authorised company.

In the event of frequent pressure drops, contact a qualified firm for assistance to remove any system leakage.

2.9 DRAINING THE SYSTEM.

To drain the boiler, use the special drain cock (Fig. 2-2).

Before draining, ensure that the filling cock is closed.

2.10 DRAINING THE BOILER.

To drain the boiler, use the special drain cock (Fig. 2-2).

N.B.: before performing this operation close the boiler cold water inlet cock and open hot water cock in the domestic water system in order to allow water to enter the boiler.

2.11 ANTI-FREEZE PROTECTION.

The boiler comes standard with an antifreeze function that activates the pump and burner when the system water temperature in the boiler falls below 4°C.

The antifreeze function is guaranteed if the boiler is fully operative and not in “block” status, and is electrically powered with the general switch positioned on Summer or Winter. To avoid keeping the system switched on in case of a prolonged absence, the system must be drained completely or antifreeze substances added to the heating system water. In both cases the

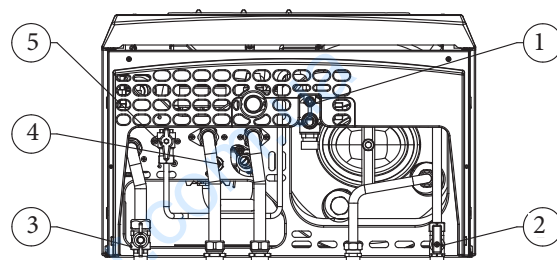
boiler domestic water circuit must be drained. In systems that are drained frequently, filling must be carried out with suitably treated water to eliminate hardness that can cause lime-scale.

2.12 CASE CLEANING.

Use damp cloths and neutral detergent to clean the boiler casing. Never use abrasive or powder detergents.

2.13 DECOMMISSIONING.

In the event of permanent shutdown of the boiler, contact an authorised firm for the relevant procedures and also ensure the electrical, water and fuel supply lines are shut off and disconnected.



BOTTOM VIEW

- 1 - Boiler drain cock
- 2 - Domestic water inlet cock
- 3 - Gas cock
- 4 - System drain cock
- 5 - System filling valve

2-2

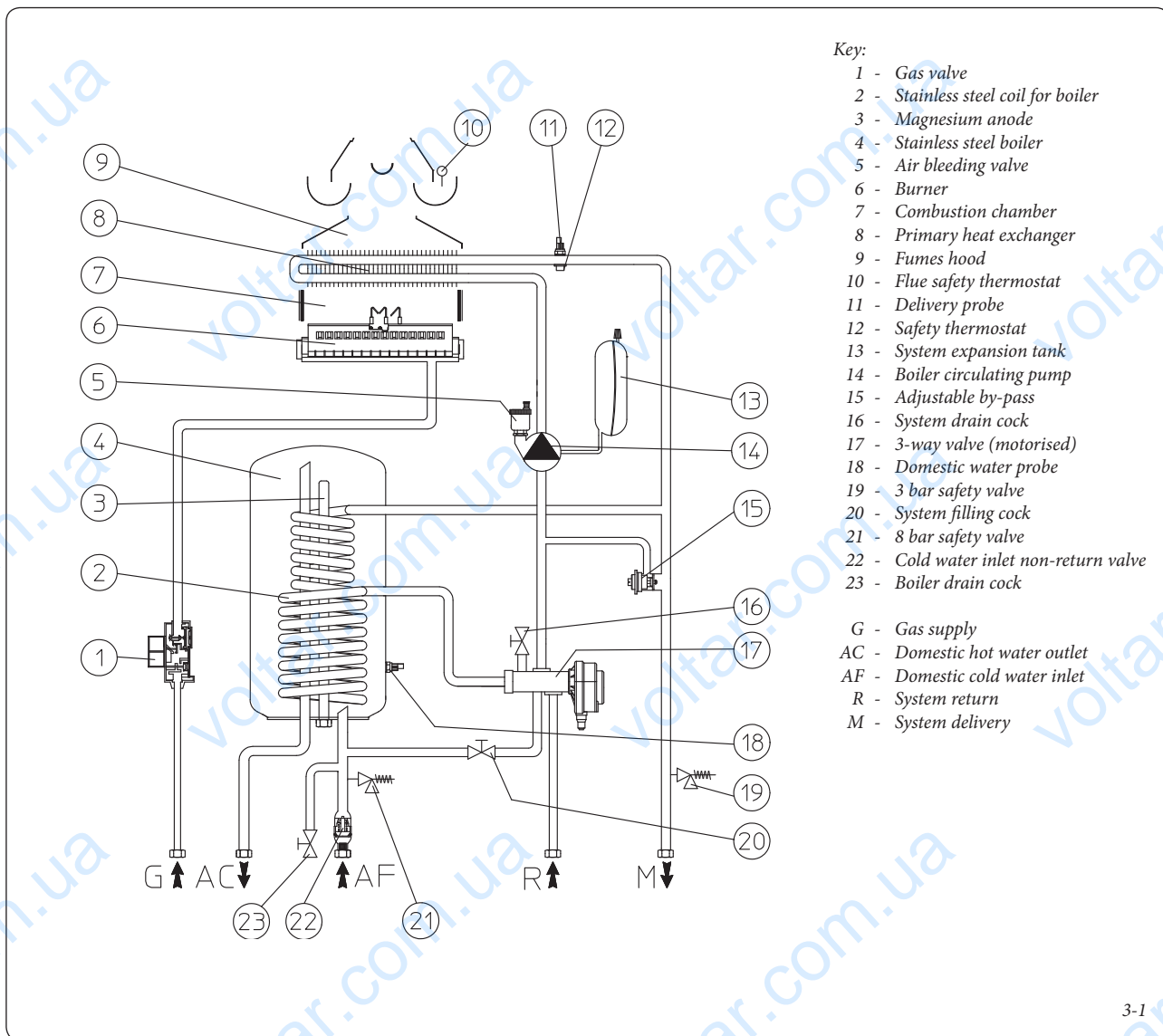
3 BOILER COMMISSIONING (INITIAL CHECK)

To commission the boiler:

- ensure that the type of gas used corresponds to boiler settings;
- check connection to a 230V-50Hz power mains, correct L-N polarity and the earthing connection;
- make sure the heating system is filled with water and that the manometer indicates a pressure of 1 - 1.2 bar;
- make sure the air valve cap is open and that the system is well deaerated;
- switch the boiler on and ensure correct ignition;
- make sure the gas maximum, medium and minimum flow rate and pressure values correspond to those given in the handbook (Par. 3.16);
- check activation of the safety device in the event of no gas, as well as the relative activation time;
- check activation of the master switch located upstream from the boiler and in the boiler;
- check the existing draught during normal functioning of the appliance, e.g. a draught gauge positioned at the exit of the appliance combustion products;
- check that there is no backflow of combustion products into the room, even during functioning of fans;
- ensure activation of all adjustment devices;
- seal the gas flow rate regulation devices (if settings are modified);
- ensure production of hot domestic water;
- ensure sealing efficiency of water circuits;
- check ventilation and/or aeration of the installation room where provided.

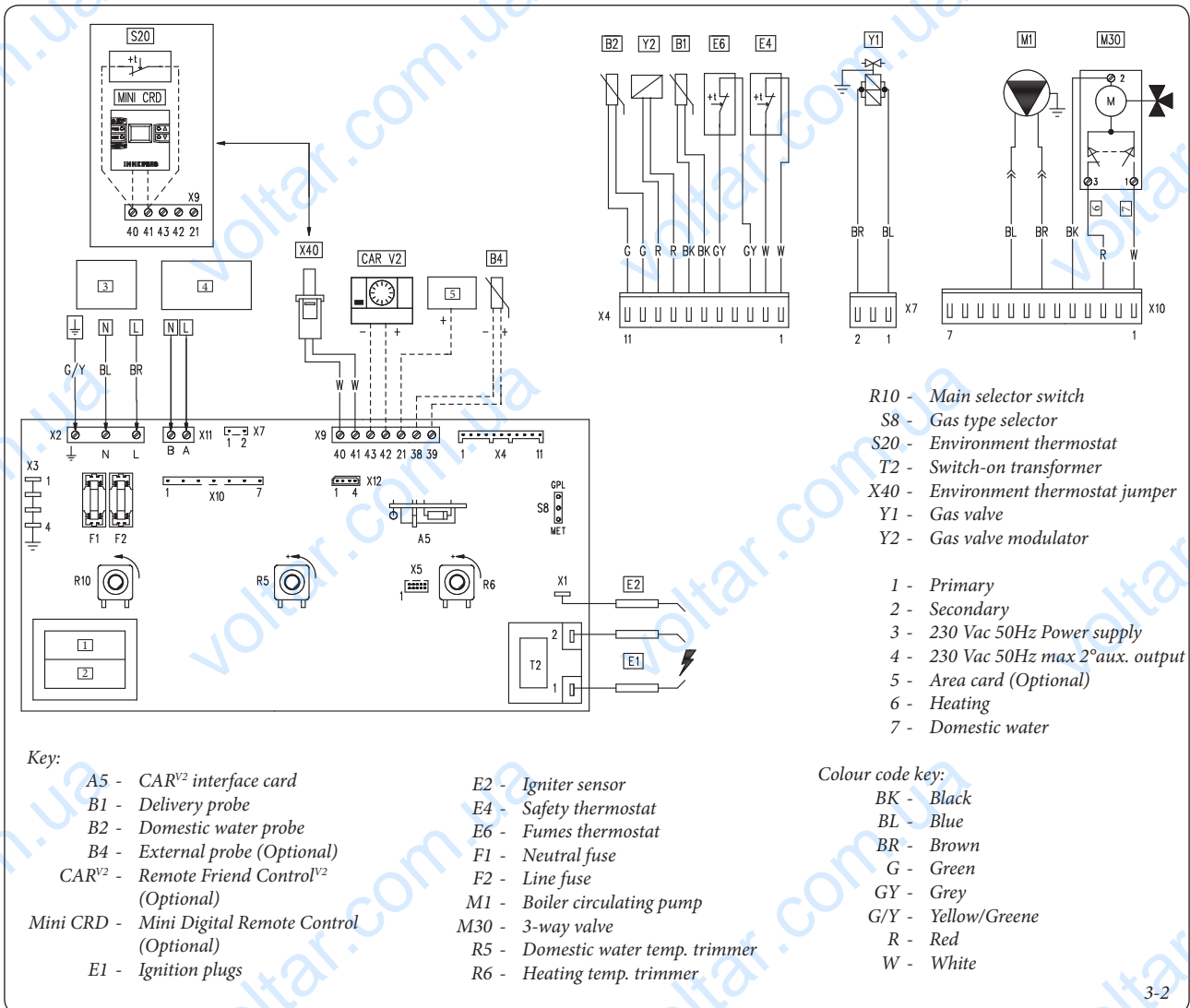
If any checks/inspection give negative results, do not start the boiler.

3.1 HYDRAULIC LAYOUT.



3-1

3.2 WIRING DIAGRAM.



Remote controls: the boiler is designed to use the Remote Friend Control^{V2} (CAR^{V2}), or as an alternative to the Mini Digital Remote Control (Mini CRD) which must be connected to clamps 42 and 43 of connector X9 for the CAR^{V2} (respecting polarity) and clamps 40 and 41 of connector X9 for the Mini CRD on the circuit board and in both cases eliminating X40.

Environment thermostat (alternative to the Mini CRD): the boiler is designed to use the Room Thermostat (S20). Connect it to clamps 40 -41 eliminating jumper X40.

Connector X12 is used for automatic inspection for connection to the personal computer.

3.3 TROUBLESHOOTING.

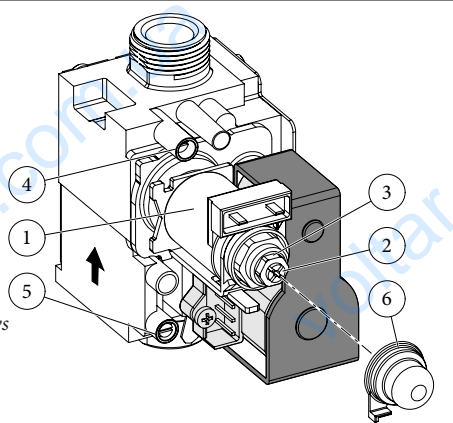
N.B.: maintenance operations must be carried out by an authorised company (e.g. Authorised After-Sales Technical Assistance Service).

- Smell of gas. Caused by leakage from gas circuit pipelines. Check sealing efficiency of gas intake circuit.
- Irregular combustion (red or yellow flame). This may be caused by: a dirty burner, or blocked boiler lamellar pack.
- Frequent activation of the temperature overload thermostat. This may be caused by lack of water in the boiler, insufficient water circulation in the circuit, a blocked circulator or an anomaly of the boiler adjustment card. Check via the pressure gauge that values are within admissible limits. Check that radiator valves are not all closed.
- The boiler produces condensate. This can be caused by obstructions of the chimney or flues with height or section not proportioned to the boiler. It can also be determined by functioning at boiler temperatures that are excessively low. In this case, make the boiler run at higher temperatures.
- Frequent interventions of the chimney safety thermostat. This can be caused by obstructions in the fumes circuit. Check the flue. The flue may be obstructed or by height or section

not suitable for the boiler. Ventilation may be insufficient (see room ventilation point).

- Presence of air in the system. Check opening of the special air bleeding cap (Fig. 1-8). Make sure the system pressure and expansion tank pre-charge values are within the set limits; the pre-charge value for the expansion tank must be 1.0 bar, and system pressure between 1 and 1.2 bar.
- Ignition block and Flue block (Par. 2.6).
- Domestic water probe broken. The boiler does not have to be emptied in order to replace the domestic water probe as the probe is not in direct contact with the domestic hot water present in the boiler.

SIT 845 gas valve

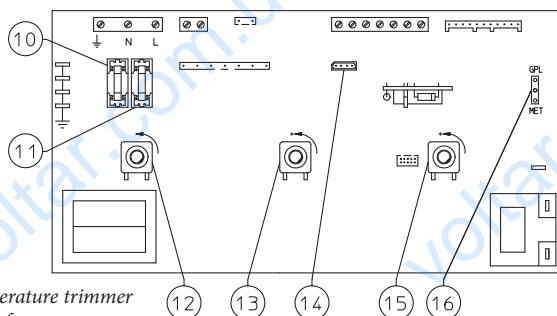


Key:

- 1 - Coil
- 2 - Minimum power adjustment screws
- 3 - Maximum power adjustment nut
- 4 - Gas valve outlet pressure point
- 5 - Gas valve inlet pressure point
- 6 - Protection hood

3-3

Circuit board



- 10 - Line fuse 3.15AF
- 11 - Neutral fuse 3.15AF
- 12 - Main selector switch
- 13 - Domestic water temperature trimmer
- 14 - RS232 computer interface
- 15 - Heating temperature trimmer
- 16 - METHANE L.P.G. gas type selector

3-4

3.4 CONVERTING THE BOILER TO OTHER TYPES OF GAS.

If the boiler has to be converted to a different gas type to that specified on the data-plate, request the relative conversion kit for quick and easy conversion.

The gas conversion operation must be carried out by an authorised company (e.g. Authorised Technical After-Sales Service).

To convert to another type of gas the following operations are required:

- remove the voltage from the appliance;
- replace the main burner injectors, making sure to insert the special seal rings supplied in the kit, between the gas manifold and the injectors;
- move jumper 16 (Fig. 3-4) into the correct position for the type of gas in use (Methane or L.P.G.);
- to access adjustments on the circuit board the cover must be removed from the dashboard by loosening the rear screw fasteners;
- apply voltage to the appliance;
- adjust the boiler maximum heat power;
- adjust the boiler minimum heat power;
- adjust (eventually) the heating power;
- seal the gas flow rate devices (if adjusted);
- after completing conversion, apply the sticker, present in the conversion kit, near the data-plate. Using an indelible marker pen, cancel the data relative to the old type of gas.

These adjustments must be made with reference to the type of gas used, following that given in the table (Par. 3.16).

3.5 CHECKS FOLLOWING CONVERSION TO ANOTHER TYPE OF GAS.

After making sure that conversion was carried out with a nozzle of suitable diameter for the type of gas used and the settings are made at the correct pressure, check that:

- there is no flame in the combustion chamber
- the burner flame is not too high or low and that it is stable (does not detach from burner)
- the pressure testers used for calibration are perfectly closed and there are no leaks from the gas circuit.

N.B.: all boiler adjustment operations must be carried out by a qualified company (e.g. Authorised After-sales Service). Burner calibration must be carried out using a "U" or digital type differential pressure gauge, connected to the gas valve pressure outlet (part. 4 Fig. 3-3), keeping to the pressure value given in the tables (Par. 3.16) according to the type of gas for which the boiler is prepared.

3.6 POSSIBLE ADJUSTMENTS OF THE GAS VALVE.

- Adjustment of boiler nominal heat output (Fig. 3-3).
- Turn the domestic hot water selector knob (10 Fig. 2-1) to the maximum functioning position;
- open the domestic hot water cock in order to prevent modulation intervention;
- adjust the boiler nominal power on the brass nut (3), keeping to the maximum pressure values stated in the tables (Par. 3.16) depending on the type of gas;
- by turning in a clockwise direction the heating potential increases and in an anti-clockwise direction it decreases.

- Adjust the boiler minimum thermal input (Fig. 3-3).

N.B.: only proceed after having calibrated the nominal pressure.

Adjustment of the minimum thermal input is obtained by operating on the cross plastic screws (2) on the gas valve maintaining the brass nut blocked (3);

- disconnect the power supply to the modulating reel (just disconnect a faston); By turning the screw in a clockwise direction, the pressure increases, in an anti-clockwise direction it decreases. On completion of calibration, re-apply the power supply to the modulating reel. The pressure to which the boiler minimum power must be adjusted, must not be lower than that stated in the tables (Par. 3.16) depending on the type of gas.
- N.B.:** to adjust the gas valve, remove the plastic cap (6); after adjusting, refit the cap and screw.

3.7 PROGRAMMING THE CIRCUIT BOARD.

The Avio 24 2 ERP boiler is prepared for possible programming of several operation parameters. By modifying these parameters as described below, the boiler can be adapted according to specific needs.

To access the programming phase, proceed as follows: position the main selector switch on Reset for a period of time between 15 and 20 seconds (after about 10 sec. LEDs 2 and 3 will start to flash at the same time. Wait for this to end and re-position the main selector switch on domestic water and heating). At this point, re-position the main selector switch on domestic water-heating.

When the programming phase has been activated, enter the first level where it is possible to choose the parameter to be set.

The latter is indicated by the fast flashing of one of the LEDs between 1 and 8 (Fig. 2-1).

Selection is made by turning the domestic hot water temperature selector switch (10). For association of the LED to the parameter, see the following table:

List of parameters	Flashing LED (fast)
Minimum heating power	Led 1
Maximum heating power	Led 2
Heating switch-on timer	Led 3
Heating power output ramp	Led 4
Heating switch-on delay on request from Environmental Thermostat, Mini Digital Remote Control or Remote Friend Control V2	Led 5
Domestic water thermostat/Boiler hysteresis	Led 6
Circulating pump functioning	Led 7
Functioning gas	Led 8
Boiler mode	Led 1 and 8

Once the parameter to be modified has been selected, confirm by turning the main selector switch to Reset momentarily until the LED relative to the parameter switches-off, then release.

Given the OK for selection, pass to the second level where it is possible to set the value of the

parameter selected. The value is indicated by the slow flashing of one of the LEDs between 1 and 8. The value is selected by rotating the heating temperature selector switch (11).

Once the value of the parameter to be modified has been selected, confirm the selection by momentarily turning the main selector switch onto Reset momentarily until the LED relative to the parameter switches off, then release.

Programming mode is exited if no operation is carried out for 30 seconds or if the main selector switch is positioned at OFF from the "parameter setting" level.

For association of the LED to the relative value, see the following tables:

Heating power. The boiler is produced and calibrated in the heating phase at nominal power. It also has electronic modulation that adapts the boiler potentiality to the effective heating demand of the house. Then the boiler works normally in a variable gas pressure field between the minimum heating power and the maximum heating power depending on the plants heating.

N.B: the selection of the "Minimum heating power" and "Maximum heating power" parameters, in the presence of a heating demand, allows switch-on of the boiler and power supply of the modulator with current equal to the value of the respective selected parameter.

Minimum heating power (continuous variation)	Flashing LED (slow)
0% I _{max} . (Standard setting)	Led 1
7% I _{max} .	Led 2
14% I _{max} .	Led 3
21% I _{max} .	Led 4
28% I _{max} .	Led 5
35% I _{max} .	Led 6
42% I _{max} .	Led 7
63% I _{max} .	Led 8

Maximum heating power (continuous variation)	Flashing LED (slow)
0% I _{max} .	Led 1
11% I _{max} .	Led 2
22% I _{max} .	Led 3
33% I _{max} .	Led 4
44% I _{max} .	Led 5
55% I _{max} .	Led 6
88% I _{max} .	Led 7
100% I _{max} . (Standard setting)	Led 8

Permanent reduction of the timer. The boiler has an electronic timing device that prevents the burner from igniting too often in the heating phase. The boiler has a standard supply of a timer adjusted at 180 seconds.

Heating switch-on timer (continuous variation)	Flashing LED (slow)
30 seconds	Led 1
55 seconds	Led 2
80 seconds	Led 3
105 seconds	Led 4
130 seconds	Led 5
155 seconds	Led 6
180 seconds (Standard setting)	Led 7
255 seconds	Led 8

Heating ramp timing. The boiler distributes the maximum power set in the previous parameter. The boiler performs an ignition ramp of about 650 seconds to arrive from minimum power to nominal heating power.

Heating ramp timer (continuous variation)	Flashing LED (slow)
65 seconds	Led 1
130 seconds	Led 2
195 seconds	Led 3
390 seconds	Led 4
455 seconds	Led 5
520 seconds	Led 6
585 seconds	Led 7
650 seconds (Standard setting)	Led 8

Heating switch-on delay request from Room thermostat and Remote Friend Control^{V2}. The boiler is set to switch-on immediately after a request. In the case of particular plants (e.g. area plants with motorised thermostatic valves etc.) it could be necessary to delay switch-on.

Heating switch-on delay request from Room thermostat and Remote Friend Control ^{V2} (continuous variation).	Flashing LED (slow)
0 seconds (Standard setting)	Led 1
54 seconds	Led 2
131 seconds	Led 3
180 seconds	Led 4
206 seconds	Led 5
355 seconds	Led 6
400 seconds	Led 7
510 seconds	Led 8

Domestic water thermostat/Boiler hysteresis. With the setting of hysteresis 1 the boiler switches on with a boiling device temperature equal to a set point at -3°C. With the setting of hysteresis 2 the boiler switches on with a boiling device temperature equal to a set point at -10°C.

Domestic water thermostat/Boiler hysteresis	Flashing LED (slow)
Hysteresis 1 (Standard setting)	Led 1
Hysteresis 1	Led 8

Circulating pump function. Two circulating pump operational modes can be selected in heating phase. In "intermittent" mode it is activated from the environmental thermostat or from the remote control, in "continual" mode the circulation pump functions constantly when the main selector switch (12) is on heating mode.

Circulating pump function	Flashing LED (slow)
Intermittent (Standard setting)	Led 1
Continuous	Led 8

Town Gas G110 - Industrial gas. The setting of this function is used to adjust the boiler in order to function with gases from the first family.

Town Gas G110 - Industrial gas (first family gas)	Flashing LED (slow)
Off (Standard setting)	Led 1
On	Led 8

Boiler mode. Establishes if the boiler functions in instantaneous mode or with boiler (standard supply).

Boiler mode	Flashing LED (slow)
Instantaneous (Cannot be used)	Led 1
With boiler (Standard setting)	Led 8

3.8 AUTOMATIC SLOW IGNITION FUNCTION WITH TIMED RAMP DELIVERY.

In the switch-on phase the electronic card carries out an increasing gas delivery ramp (with pressure values that depend on the type of gas selected) of preset duration. This avoids every boiler lighting phase calibration or preparation operation in any conditions of use.

3.9 "CHIMNEY SWEEP" FUNCTION.

When activated, this function forces the boiler at max. output for 15 minutes.

In this mode all the adjustments are cut out and only the temperature safety thermostat and the limit thermostat remain active. To activate the "Chimney-Sweep" function, press the Reset key for 8 to 15 seconds in absence of domestic water and heating requests. Its activation is indicated by the simultaneous flashing of LEDs (2) and (3). This function allows the technician to check the combustion parameters. After the checks deactivate the function, switching the boiler off and then on again.

3.10 PUMP ANTI-BLOCK FUNCTION.

The boiler has a function that starts the pump once every 24 hours for the duration of 30 seconds in order to reduce the risk of the pump becoming blocked due to prolonged inactivity.

3.11 THREE-WAY ANTI-BLOCK SYSTEM.

Both in "domestic" and in "domestic-heating" phase the boiler is equipped with a function that starts the three-way motorized group 24 hours after it was last in operation, running it for a full cycle so as to reduce the risk of the three-way group becoming blocked due to prolonged inactivity.

3.12 RADIATOR ANTI-FREEZE FUNCTION.

If the system return water is below 4°C, the boiler starts up until reaching 42°C.

3.13 ELECTRONIC CARD PERIODICAL SELF-CHECK.

During operation in heating mode or with boiler in standby, the function activates every 18 hours after the last boiler check/power supply. In case of operation in domestic circuit mode the self-check starts within 10 minutes after the end of the drawing in progress, for a length of approx. 10 seconds.

N.B.: During self-check, the boiler remains off, including signalling.

3.14 YEARLY APPLIANCE CHECK AND MAINTENANCE.

The following checks and maintenance should be performed at least once a year.

- Clean the flue side of the heat exchanger.
- Clean the main burner.
- Visually check the fume hood for deterioration or corrosion.
- Check correct lighting and operation.
- Ensure correct calibration of the burner in domestic water and heating phases.
- Check correct operation of control and adjustment devices and in particular:
 - intervention of electrical main electrical switch on boiler;
 - system control thermostat intervention;
 - domestic water control thermostat intervention
- Check that the internal system is properly sealed according to specifications.
- Check intervention of the device against no gas ionization flame control:
 - Intervention time must be less than 10 seconds.
- Visually check for water leaks or oxidation from/on connections.
- Visually check that the water safety drain valve is not blocked.
- Check that, after discharging system pressure and bringing it to zero (read on boiler pressure gauge), the expansion tank charge is at 1.0 bar.
- Check that the system static pressure (with system cold and after refilling the system by means of the filler cock) is between 1 and 1.2 bar.
- Check visually that the safety and control devices have not been tampered with and/or shorted, in particular
 - temperature safety thermostat;

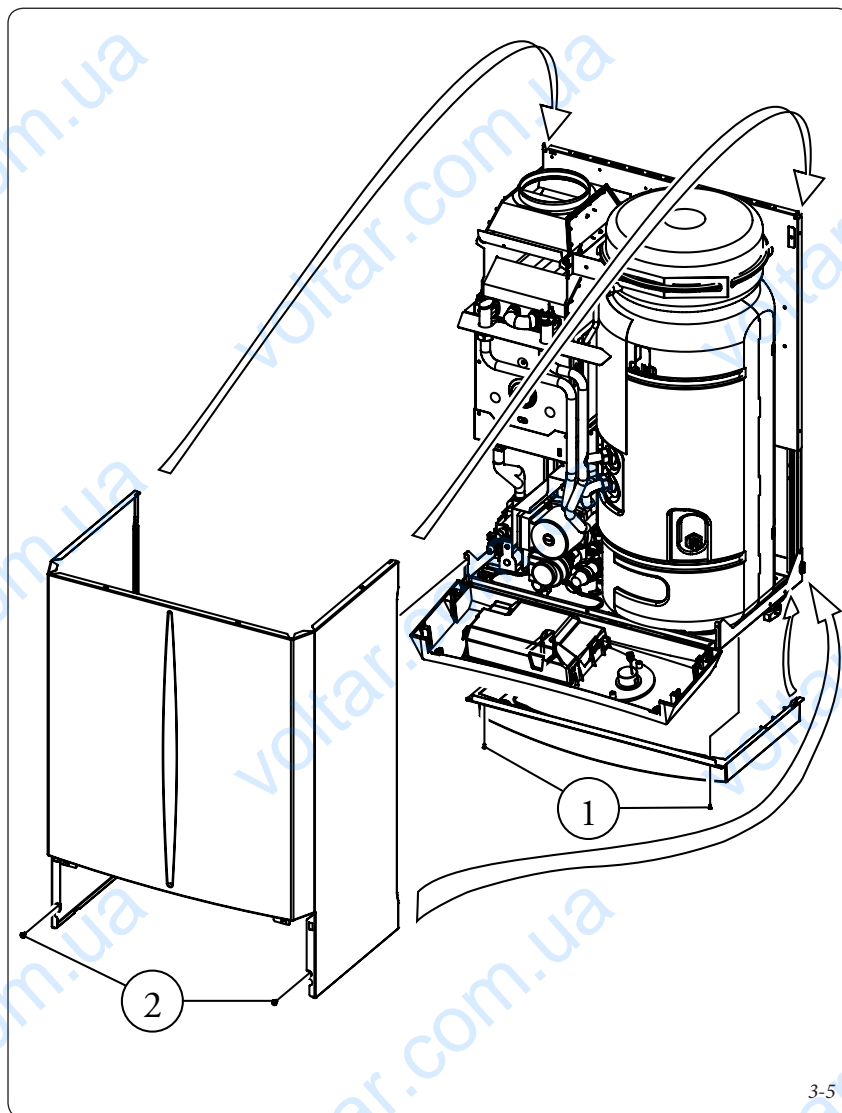
- fumes pressure switch.
- Check integrity of the boiler Magnesium anode.
- Check the condition and integrity of the electrical system and in particular:
 - electrical power cables must be inside the whipping;
 - there must be no traces of blackening or burning.

N.B.: in addition to yearly maintenance, the thermal system must also be checked, with frequency and procedures that comply with the provisions of the technical regulations in force.

3.15 CASING REMOVAL.

To facilitate boiler maintenance the casing can be completely removed as follows (Fig. 3-5):

- Disassemble the lower cover by removing the two relevant screws (1).
- Unscrew the two screw fasteners on the dashboard and open it making it pivot.
- Unscrew the 2 fixing screws (2) on the casing.
- Unhook the lower part of the casing as described in the figure.
- Pull the casing (4) forwards and up at the same time (see figure) to detach it from the upper hooks.



3-5

3.16 VARIABLE HEAT POWER.

N.B.: Gas flow rates refer to heating power below a temperature of 15°C and at a pressure of 1013 mbar.

Burner pressure values refer to use of gas at 15°C.

			METHANE (G20)			BUTANE (G30)			PROPANE (G31)		
	HEAT POWER	HEAT POWER	GAS FLOW RATE BURNER	NOZZLE PRESSURE BURNER		GAS FLOW RATE BURNER	NOZZLE PRESSURE BURNER		GAS FLOW RATE BURNER	NOZZLE PRESSURE BURNER	
	(kW)	(kcal/h)		(mbar)	(mm H ₂ O)		(mbar)	(mm H ₂ O)		(mbar)	(mm H ₂ O)
MAX.	23,7	20382	2,77	13,30	135,6	2,07	27,80	283,5	2,04	35,80	365,1
MIN CEN. HEAT.	10,4	8944	1,27	3,00	30,6	0,95	7,12	72,6	0,93	8,38	85,4
MIN D.H.W.	9,5	8170	1,17	2,50	25,5	0,87	5,50	56,1	0,86	6,93	70,7

3.17 COMBUSTION PARAMETERS.

		G20	G30	G31
Gas nozzle diameter	mm	1,30	0,79	0,79
Supply pressure	mbar (mm H ₂ O)	20 (204)	29 (296)	37 (377)
Flue flow rate at nominal heat output	kg/h	73	70	72
Flue flow rate at minimum heat output	kg/h	57	54	56
CO ₂ at Q. Nom./Min.	%	5,00 / 2,60	6,10 / 3,20	5,90 / 3,10
CO at 0% of O ₂ at Q. Nom./Min.	ppm	55 / 45	109 / 59	59 / 50
NOX at 0% of O ₂ at Q. Nom./Min.	ppm	177 / 81	279 / 115	240 / 108
Flue temperature at nominal heat output	°C	101	106	104
Flue temperature at minimum heat output	°C	74	77	76

Combustion parameters: measuring conditions of useful efficiency (flow temperature/return temperature= 80/60 °C), ambient temperature reference = 15°C.

INSTALLATOR

USER

MAINTENANCE TECHNICIAN

3.18 TECHNICAL DATA.

INSTALLATOR	Nominal heating power	kW (kcal/h)	26,2 (22546)
	Central heating minimum heat output	kW (kcal/h)	12,0 (10341)
	Domestic hot water minimum heat output	kW (kcal/h)	11,0 (9500)
	Nominal heating power (useful)	kW (kcal/h)	23,7 (20382)
	Central heating minimum heat output (useful)	kW (kcal/h)	10,4 (8944)
	Domestic hot water minimum heat output (useful)	kW (kcal/h)	9,5 (8170)
	* Useful thermal efficiency at nominal output	%	90,4
	* Useful thermal efficiency at 30% nominal output	%	86,5
	Heat loss at case with burner On/Off	%	2,40 / 0,57
	Heat loss at flue with burner On/Off	%	7,20 / 0,43
USER	Heating circuit max. working pressure	bar	3
	Heating circuit max. working temperature	°C	90
	Adjustable heating temperature	°C	35 - 85
	Total volume system heating expansion tank	l	7,7
	Heating expansion tank pre-charge	bar	1,0
	Total volume of DHW expansion vessel	l	1,2
	DHW expansion vessel factory-set pressure	bar	3,5
	Generator water capacity	l	3,6
	Head available with flow rate 1000/h	kPa (m H ₂ O)	26,2 (2,7)
	Hot water production available heat output	kW (kcal/h)	23,7 (20382)
	Domestic hot water adjustable temperature	°C	20 - 60
	Domestic circuit min. pressure (dynamic)	bar	0,3
	Domestic circuit max. working pressure	bar	8,0
	Specific capacity (ΔT 30°C)	l/min	13,5
	Weight of full boiler	kg	53,6
	Weight of empty boiler	kg	50,0
	Electric attachment	V/Hz	230 / 50
	Nominal absorption	A	0,4
	Installed electric power	W	45
	MAINTENANCE TECHNICIAN	Power absorbed by circulation pump	W
Value EEI		-	≤ 0,20 - Part. 3
Equipment electrical system protection		-	IPX4D
NOX class		-	3
NOX weighted		mg/kWh	146
CO weighted		mg/kWh	49
Type of appliance		B11 _{BS}	
Category		II2H3+	

- The data relevant to domestic hot water performance refer to a dynamic inlet pressure of 2 bar and an inlet temperature of 15°C; the values are measured directly at the boiler outlet considering that to obtain the data declared mixing with cold water is necessary.

- * Efficiencies refer to the lower heating value

3.19 DATA PLATE KEY.

Md		Cod. Md	
Sr N°	CHK	Cod. PIN	
Type			
Q _{nw} /Q _n min.	Q _{nw} /Q _n max.	P _n min.	P _n max.
PMS	PMW	D	TM
NO _x Class			

Note: the technical data are shown on the boiler data plate

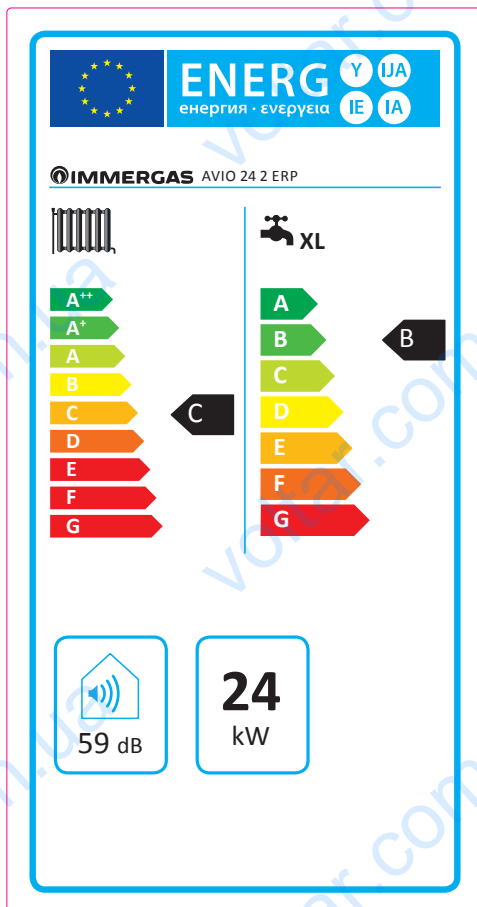
	IE
Md	Model
Cod. Md	Model code
Sr N°	Serial Number
CHK	Check
Cod. PIN	PIN code
Type	Type of installation (ref. CEN TR 1749)
Q _{nw} min.	Minimum heating capacity (domestic)
Q _n min.	Minimum heating capacity (heating)
Q _{nw} max.	Maximum heating capacity (domestic)
Q _n max.	Maximum heating capacity (heating)
P _n min.	Minimum heat output
P _n max.	Maximum heat output
PMS	Maximum pressure (system)
PMW	Maximum pressure (domestic)
D	Specific flow rate
TM	Maximum working temperature
NO _x Class	Nox Class

3.20 TECHNICAL PARAMETERS FOR COMBINATION BOILERS (IN COMPLIANCE WITH REGULATION 813/2013).

Efficiencies in the following tables refer to the gross calorific value.

Model/s:				Avio 24 2 ErP						
Condensing Boilers:				NO						
Low temperature boiler:				NO						
Boiler type B1:				YES						
Co-generation appliance for central heating:				NO		Fitted with supplementary heating system:		NO		
Mixed heating appliance:				YES						
Element	Symbol	Value	Unit	Element	Symbol	Value	Unit			
Nominal heat output	P_n	24	kW	Seasonal energy efficiency of central heating	η_s	75	%			
For central heating only and combination boilers: useful heat output				For central heating only and combination boilers: useful efficiency						
At nominal heat output in high temperature mode (*)	P_4	23,7	kW	At nominal heat output in high temperature mode (*)	η_4	81,4	%			
At 30% of nominal heat output in a low temperature mode (**)	P_1	6,8	kW	At 30% of nominal heat output in a low temperature mode (**)	η_1	77,9	%			
Auxiliary electricity consumption				Other items						
At full load	el_{max}	0,014	kW	Heat loss in standby	P_{sby}	0,113	kW			
At partial load	el_{min}	0,014	kW	Ignition burner energy consumption	P_{ign}	0,000	kW			
In standby mode	P_{SB}	0,003	kW	Emissions of nitrogen oxides	NO_x	132	mg / kWh			
For mixed central heating appliances										
Stated load profile			XL		Domestic hot water production efficiency		η_{WH}	75	%	
Daily electrical power consumption			Q_{elec}	0,163	kWh	Daily gas consumption		Q_{fuel}	26,874	kWh
Contact information		IMMERGAS S.p.A. VIA CISA LIGURE, 95 - 42041 BRESCELLO (RE) ITALY								
(*) High temperature mode means 60°C on return and 80°C on flow.										
(**) Low temperature mode for condensation Boilers means 30°C, for low temperature boilers 37°C and for other appliances 50°C of return temperature.										

3.21 PRODUCT FICHE (IN COMPLIANCE WITH REGULATION 811/2013).



Parameter	value
Annual energy consumption for the heating function (Q_{HE})	91,3 GJ
Annual electricity consumption for the domestic hot water function (AEC)	36 kWh
Annual fuel consumption for the domestic hot water function (AFC)	20 GJ
Seasonal space heating energy efficiency (η_s)	75 %
Water heating energy efficiency (η_{wh})	75 %

For proper installation of the appliance refer to chapter 1 of this booklet (for the installer) and current installation regulations. For proper maintenance refer to chapter 3 of this booklet (for the maintenance technician) and adhere to the frequencies and methods set out herein.

3.22 PARAMETERS FOR FILLING IN THE PACKAGE FICHE.

In case you should wish to install an assembly, starting from the Avio 24 2 ErP boiler, use the assembly charts in fig. 3-8 and 3-11.

For correctly filling in, enter the figures shown in tables fig. 3-6 and 3-9 (as shown in the facsimile package fiche fig. 3-7 and 3-10).

The remaining values must be obtained from the technical data sheets of the products used

to make up the assembly (e.g. solar devices, integration heat pumps, temperature controllers). Use sheet fig. 3-8 for "assemblies" related to the heating function (e.g.: boiler + temperature controller).

Use sheet fig. 3-11 for "assemblies" related to the domestic hot water function (e.g.: boiler + solar thermal system).

Facsimile for filling in the package fiche for preferential boiler space heaters.

Seasonal space heating energy efficiency of boiler 1 %

Temperature control 2 %
 From fiche of temperature control

Class I = 1 %, Class II = 2 %,
 Class III = 1.5 %, Class IV = 2 %,
 Class V = 3 %, Class VI = 4 %,
 Class VII = 3.5 %, Class VIII = 5 %

Supplementary boiler 3 %
 From fiche of boiler

Seasonal space heating energy efficiency (in %)

$$(\text{ } - \text{'I'}) \times 0.1 = \pm \text{ } \%$$

Solar contribution

From fiche of solar device

Collector size (in m²)

Tank volume (in m³)

Collector efficiency (in %)

Tank rating
 A* = 0.95, A = 0.91,
 B = 0.86, C = 0.83,
 D-G = 0.81

$$(\text{'III'} \times \text{ } + \text{'IV'} \times \text{ }) \times (0.9 \times (\text{ } / 100) \times \text{ }) = + \text{ } \%$$

Supplementary heat pump 5 %
 From fiche of heat pump

Seasonal space heating energy efficiency (in %)

$$(\text{ } - \text{'I'}) \times \text{'II'} = + \text{ } \%$$

Solar contribution and Supplementary heat pump

Select smaller value 6 %

$$0.5 \times \text{ } \text{ OR } 0.5 \times \text{ } = - \text{ } \%$$

Seasonal space heating energy efficiency of package 7 %

Seasonal space heating energy efficiency class of package

G	F	E	D	C	B	A	A⁺	A⁺⁺	A⁺⁺⁺

< 30 % ≥ 30 % ≥ 34 % ≥ 36 % ≥ 75 % ≥ 82 % ≥ 90 % ≥ 98 % ≥ 125 % ≥ 150 %

Boiler and supplementary heat pump installed with low temperature heat emitters at 35°C?

From fiche of heat pump 7 + (50 x 'II') = %

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as the efficiency is influenced by further factors such as heat loss in the distribution system and the dimensioning of the products in relation to building size and characteristics.

Parameters for filling in the assembly chart.

Parameter	Avio 24 2 ErP
'I'	75
'II'	*
'III'	1,11
'IV'	0,43

* to be established by means of table 5 of Regulation 811/2013 in case of "assembly" including a heat pump to integrate the boiler. In this case the boiler must be considered as the main appliance of the assembly.

3-7

Room heating system package fiche.

Seasonal space heating energy efficiency of boiler 1 %

Temperature control 2 %
 From fiche of temperature control
 Class I = 1 %, Class II = 2 %, Class III = 1.5 %, Class IV = 2 %, Class V = 3 %, Class VI = 4 %, Class VII = 3.5 %, Class VIII = 5 %

Supplementary boiler 3 %
 From fiche of boiler
 Seasonal space heating energy efficiency (in %)
 $(\text{ } - \text{ }) \times 0.1 = \pm \text{ } \%$

Solar contribution 4 %
 From fiche of solar device
 Collector size (in m²) Tank volume (in m³) Collector efficiency (in %)
 Tank rating: A* = 0.95, A = 0.91, B = 0.86, C = 0.83, D-G = 0.81
 $(\text{ } \times \text{ } + \text{ } \times \text{ }) \times (0.9 \times (\text{ } / 100) \times \text{ } = + \text{ } \%$

Supplementary heat pump 5 %
 From fiche of heat pump
 Seasonal space heating energy efficiency (in %)
 $(\text{ } - \text{ }) \times \text{ } = + \text{ } \%$

Solar contribution and Supplementary heat pump 6 %
 Select smaller value $0.5 \times \text{ } \text{ OR } 0.5 \times \text{ } = - \text{ } \%$

Seasonal space heating energy efficiency of package 7 %

Seasonal space heating energy efficiency class of package

□	□	□	□	□	□	□	□	□	□
G	F	E	D	C	B	A	A⁺	A⁺⁺	A⁺⁺⁺
< 30 %	≥ 30 %	≥ 34 %	≥ 36 %	≥ 75 %	≥ 82 %	≥ 90 %	≥ 98 %	≥ 125 %	≥ 150 %

Boiler and supplementary heat pump installed with low temperature heat emitters at 35°C? 7

From fiche of heat pump + (50 x) = %

The energy efficiency of the package of products provided far in this fiche may not correspond to its actual energy efficiency once installed in a building, as the efficiency is influenced by further factors such as heat loss in the distribution system and the dimensioning of the products in relation to building size and characteristics.

3-8

Facsimile for filling in domestic hot water production system package fiche.

Water heating energy efficiency of combination heater

¹
 %

Declared load profile:

Solar contribution

From fiche of solar device

Auxiliary electricity

$(1,1 \times 'I' - 10\%) \times 'II' - 'III' - 'I' = + \text{} \%$

Water heating energy efficiency of package under average climate

³
 %

Water heating energy efficiency class of package under average climate

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G	F	E	D	C	B	A	A⁺	A⁺⁺	A⁺⁺⁺
<input type="checkbox"/> M	$< 27\% \geq 27\% \geq 30\% \geq 33\% \geq 36\% \geq 39\% \geq 65\% \geq 100\% \geq 130\% \geq 163\%$								
<input type="checkbox"/> L	$< 27\% \geq 27\% \geq 30\% \geq 34\% \geq 37\% \geq 50\% \geq 75\% \geq 115\% \geq 150\% \geq 188\%$								
<input type="checkbox"/> XL	$< 27\% \geq 27\% \geq 30\% \geq 35\% \geq 38\% \geq 55\% \geq 80\% \geq 123\% \geq 160\% \geq 200\%$								
<input type="checkbox"/> XXL	$< 28\% \geq 28\% \geq 32\% \geq 36\% \geq 40\% \geq 60\% \geq 85\% \geq 131\% \geq 170\% \geq 213\%$								

Water heating energy efficiency under colder and warmer climate conditions

Colder: ³ - 0.2 x ² = %

Warmer: ³ + 0.4 x ² = %

The energy efficiency of the package of products provided far in this fiche may not correspond to its actual energy efficiency once installed in a building, as the efficiency is influenced by further factors such as heat loss in the distribution system and the dimensioning of the products in relation to building size and characteristics.

Parameters for filling in DHW package assembly chart.

Parameter	Avio 24 2 ErP
'I'	75
'II'	*
'III'	*

* to be determined according to Regulation 811/2013 and transient calculation methods as per Notice of the European Community no. 207/2014.

3-10

Domestic hot water production system package fiche.

Water heating energy efficiency of combination heater

%

Declared load profile:

Solar contribution

From fiche of solar device

Auxiliary electricity

$$(1,1 \times \text{---} - 10\%) \times \text{---} - \text{---} = + \text{---} \%$$

Water heating energy efficiency of package under average climate

%

Water heating energy efficiency class of package under average climate

	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	G	F	E	D	C	B	A	A ⁺	A ⁺⁺	A ⁺⁺⁺
<input type="checkbox"/> M	< 27 %	≥ 27 %	≥ 30 %	≥ 33 %	≥ 36 %	≥ 39 %	≥ 65 %	≥ 100 %	≥ 130 %	≥ 163 %
<input type="checkbox"/> L	< 27 %	≥ 27 %	≥ 30 %	≥ 34 %	≥ 37 %	≥ 50 %	≥ 75 %	≥ 115 %	≥ 150 %	≥ 188 %
<input type="checkbox"/> XL	< 27 %	≥ 27 %	≥ 30 %	≥ 35 %	≥ 38 %	≥ 55 %	≥ 80 %	≥ 123 %	≥ 160 %	≥ 200 %
<input type="checkbox"/> XXL	< 28 %	≥ 28 %	≥ 32 %	≥ 36 %	≥ 40 %	≥ 60 %	≥ 85 %	≥ 131 %	≥ 170 %	≥ 213 %

Water heating energy efficiency under colder and warmer climate conditions

Colder: - 0.2 x = %

Warmer: + 0.4 x = %

The energy efficiency of the package of products provided for in this fiche may not correspond to its actual energy efficiency once installed in a building, as the efficiency is influenced by further factors such as heat loss in the distribution system and the dimensioning of the products in relation to building size and characteristics.

3-11

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